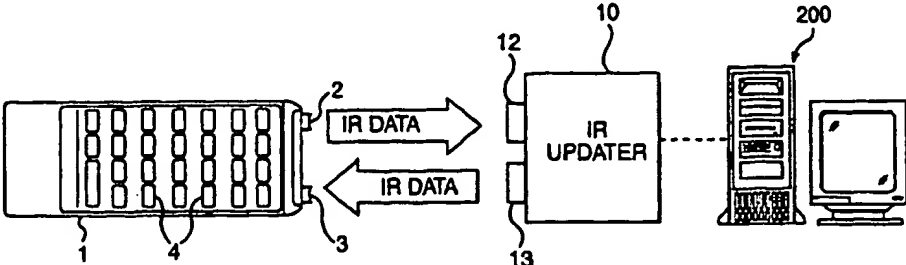


**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>G08C 19/28</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 99/50807</b> <b>(43) International Publication Date:</b> 7 October 1999 (07.10.99)
<b>(21) International Application Number:</b> PCT/US99/06796 <b>(22) International Filing Date:</b> 30 March 1999 (30.03.99) <b>(30) Priority Data:</b> 60/079,832 30 March 1998 (30.03.98) US <b>(71) Applicant:</b> U.S. ELECTRONICS COMPONENTS CORP. [US/US]; Suite 52, 585 North Bicycle Path, Port Jefferson Station, NY 11776 (US). <b>(72) Inventor:</b> VERZULLI, Christopher, J.; Suite 52, 585 North Bicycle Path, Port Jefferson Station, NY 11776 (US). <b>(74) Agent:</b> GAYBRICK, Robert, J.; Morgan, Lewis & Bockius LLP, 1800 M Street, N.W., Washington, DC 20036 (US).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
<b>(54) Title:</b> UPGRADEABLE REMOTE CONTROL   <b>(57) Abstract</b>  A remote control system includes: a remote device having a CPU, a memory coupled to the CPU for storing operating software and code data for controlling external devices, and keys coupled to the CPU for inputting commands to the remote device; a receiver on the remote device being coupled to the CPU for receiving at least one of operating software and code data over a wireless communication link and transmitting the at least one of operating software and code data to the CPU for decoding; and a transmitter on the remote device being coupled to the CPU for transmitting control data to the external devices, and for transmitting data to an updater, wherein the updater has an updater receiver for receiving data from the transmitter of the remote device and an updater transmitter for transmitting the at least one of operating software and code data to the receiver on the control device.		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

**UPGRADEABLE REMOTE CONTROL****BACKGROUND OF THE INVENTION****Field of the Invention**

The present invention relates to a remote control and more particularly to a remote control that can be upgraded through a data transmission system that inputs operating software and data into the remote control.

**Discussion of the Related Art**

5           Conventional remote controls have been made reconfigurable such that they have the ability to learn, store, and repeat remote control codes from other such remote controls. These conventional remote control devices generally include an infrared receiver, a microprocessor, a non-volatile RAM, a scratch pad RAM, and an infrared transmitter. Accordingly, these types of remote controls only capture a “free  
10       format” infrared signal of an existing remote control and then play back that signal at a later time.

          During the learning process, the infrared receiver decodes transmissions from another host remote control, associates each transmission with a particular button or key or the reconfigurable remote control, and stores the data encoded within the  
15       transmitted signal in memory. Thus, the user trains the conventional reconfigurable remote control by first processing a “learn” button. The button to be reconfigured in the remote control is then processed, followed by depression of the associated button on the host remote control. The user must accurately gauge successful transmission, reception, and data storage between units. The process is conducted separately to  
20       train each individual button on the remote control, and in some systems, must be

operated at least twice for each button to ensure proper reception and decoding. For a conventional, reconfigurable remote control, the learning process to effectuate commands from another remote control can be repetitive and tiring.

For the conventional remote control, the operating system software in the unit  
5 remains unchanged, and only the particular data relating to commands associated with particular, individual buttons are reconfigured. In other words, the data received by the remote control during the learning process does not represent instructions, but is instead the actual transmitted signal from the host remote control. Therefore, the conventional remote control stores the transmitted signal associated  
10 with a particular key or button in order to mimic or repeat that signal later during operation.

Another conventional remote control has been made upgradeable by transmitting control data for operating other devices to a remote control via a cable directly to a computer, or via a telephone modem. However, data transmission is  
15 one-way only, from the computer to the remote control. Further, this conventional, upgradeable remote control system requires a physical attachment through interlocking pieces during the upgrading process. These connecting pieces may become damaged, and the necessary separate cable may become damaged or lost. The remote control unit also must have a dedicated portion that allows for  
20 interconnection and engagement with the separate, interlocking components. This utilizes spaces on the portable unit, and requires careful designing so as not to cause an unattractive appearance for the unit.

**SUMMARY OF THE INVENTION**

Accordingly, the present invention is directed to a remote control that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

5           An object of the present invention is to provide a system for updating the operating software and data contained in a remote control type device via an infrared link.

          Another object of the present invention is to provide a system for updating the operating software or data contained in a remote control type device via a radio  
10       frequency link.

          Another object of the present invention is to provide a system for two-way communication between a receiving remote control type device and a device in which operating software and code data are stored and sent.

          Yet another object of the present invention is to provide a system for  
15       automatically updating the operating software in a remote control type device through a wireless communication link.

          Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the  
20       invention will be realized and attained by the system and method pointed out in the written description and claims hereof as well as the appended drawings.

          To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, a remote control system

includes a remote device having a CPU, a memory coupled to the CPU for storing operating software and code data for controlling external devices, and keys coupled to the CPU for inputting commands to the remote device; a receiver on the remote device being coupled to the CPU for receiving at least one of operating software and code data over a wireless communication link and transmitting the at least one of operating software and code data to the CPU for decoding; and a transmitter on the remote device being coupled to the CPU for transmitting control data to the external devices, and for transmitting data to an updater; wherein the updater has an updater receiver for receiving data from the transmitter of the remote device and an updater transmitter for transmitting the at least one of operating software and code data to the receiver on the control device.

In another aspect of the present invention, a remote control system includes a remote device having a CPU, a memory coupled to the CPU for storing operating software and code data for controlling external devices, and keys coupled to the CPU for inputting commands to the remote device; a receiver on the remote device being coupled to the CPU for receiving at least one of operating software and code data over a wireless communication link and transmitting the at least one of operating software and code data to the CPU for decoding; and a transmitter on the remote device being coupled to the CPU for transmitting control data to the external devices; wherein the updater has an updater transmitter for transmitting the at least one of operating software and code data to the receiver on the control device.

In yet another aspect of the present invention, a method of upgrading a remote control includes the steps of transmitting at least one of operating software

and control data from an updater transmitter on an updater device to a receiver on a remote device over a wireless communication link; receiving the at least one of operating software and code data through the receiver on the remote device and sending the received at least one of operating software and code data to a CPU in the remote device; decoding the received at least one of operating software and code data in the CPU; and storing the decoded at least one of operating software and code data in a memory in the remote device.

In another aspect of the present invention, a method of communicating between a remote device and data unit includes the steps of transmitting communication signals from an updater transmitter on a data unit to a receiver on a remote device over a wireless communication link; receiving the communication signals through the receiver on the remote device and sending the received signals to a CPU in the remote device; decoding the received signals in the CPU; determining if the communication signals request that the remote device perform operations; performing operations requested by the communication signals; creating data responses resulting from the performed operations; and transmitting the data responses from a transmitter on the remote device to an updater receiver on the data unit via the communication link.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

Fig. 1 is a block diagram showing a first preferred embodiment of the system for updating the operating software and data contained in a remote control type device via an IR communications link.

5            Fig. 2 is a block diagram showing a second preferred embodiment of the system for updating the operating software and data contained in a remote control type device via an RF communications link.

            Fig. 3 is a block diagram showing a third preferred embodiment of the system for updating the operating software and data contained in a keyboard type device via  
10           an IR communications link.

            Fig. 4 is a block diagram showing a fourth preferred embodiment of the system for updating the operating software and data contained in a keyboard type device via an RF communications link.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

15           Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

            In Fig. 1, the system for updating the operating software and data contained in a remote control type device includes a handheld remote control device 1. This device includes an infrared ("IR") transmitter 2 and an IR receiver 3. The remote  
20           control device also includes a set of pushbuttons or keys 4, a central processing unit ("CPU") (not shown), and a memory (not shown). The system also includes an IR updater 10 in which operating software for the remote control device and code data for operating a variety of devices are stored. The IR updater 10 has IR transmitter



13. The IR updater may also have an IR receiver 12 for two way communication during updating, although this is not required. The IR updater may be used as a stand alone unit or may be attached to an external computer ("PC") 200. The updater also can be an integrated component of the television, and can itself be  
5 updated via television signals received through satellite or cable transmissions.

In the first preferred embodiment, a formatted data stream that is known both to the remote control device 1 and the IR updater 10 is transmitted between the two devices over an IR link. For example, the IR transmitter 13 of the IR updater 10 transmits operating software or code data, and the IR receiver 3 of the remote control  
10 device 1 receives that information coming in over the IR link. This received operating software or code data is appropriately processed and decoded in the CPU to update the operating software or code data, respectively, and is stored in the memory of the remote control device 1.

The data transmitted from the IR updater 10 also may contain commands that  
15 request action from the remote control device 1. For example, the data transmitted to the remote control device 1 may require the remote control device to perform diagnostics and report the results. Thus, after receiving a command through the IR receiver 2, the remote control device 1 processes the command, runs the diagnostics, and transmits the results through the IR transmitter 2 to the IR receiver 12 of the IR  
20 updater 10.

The signal transmitted from the updater, to the remote control, representing software or code data, is detected through at least one photodiode in the remote control. The photodiode, or plurality of photodiodes, can be placed within the

vicinity of the diodes that transmit the signals from the remote control to the television or other appliances to be controlled by the remote control. The photodiode(s) is connected to a differentiating capacitor and a threshold amplifier.

5       The process for updating the remote control by updating the software is greatly simplified as compared to reconfiguration of a conventional reconfigurable remote control unit. The user first activates the "learning mode" for the remote control. This can be done by pressing a single key on the remote control unit.

10       The user then activates the updater. The remote control is positioned to facilitate IR communication between the updater and the remote control. Ideally, the remote control is placed on a stationary surface with the photodiode facing the transmitter in the updater, and approximately five feet from the updater. The updating process can also be performed while the user holds on to the remote control. Depending on the complexity of software to be updated, the communication time may require only seconds. During this time, commands for every operation of  
15       the remote control can be modified or altered. Alternatively, the updating process may only modify a select portion of features, or add new commands or features.

      The remote control device also will transmit signals from the IR transmitter 2 to control external appliances, the signals being based upon commands input through the keys 4 of the remote control device.

20       The remote control according to the present invention can be designed for one way communication or two way communication with full handshaking. For one way communication the signal is transmitted from the updater to the remote control during the updating process and the remote control only receives the updated

software or code data. With two-way communication, the remote control sends signals back to the updater during the updating process. These signals can include indicators indicating "ready to receive," "confirmation of receipt," or "request for updating." With either one way communication or bidirectional communication, the  
5 updating process may conclude with an audible signal or visible signal on the updater to indicate completion of transmission, or a comparable signal on the remote control itself.

Fig. 2 is a second preferred embodiment of the present invention. The second embodiment is similar to the first embodiment in some respects; however,  
10 radio frequency is used as the link between the remote control device and the updater. Therefore, the remote control 20 has a radio frequency ("RF") receiver 23 and an RF transmitter 22. The second embodiment also has an RF updater 30, which includes an RF transmitter 33 and an RF receiver 32. The transmission of operating software and code data in the second embodiment is updated via a radio link, and  
15 may be performed in a similar manner and in the similar variations as discussed for the first embodiment.

Fig. 3 is a third embodiment of the present invention. Instead of a handheld remote control device, the third embodiment includes a keyboard 40 that has a CPU and memory (not shown), an IR transmitter 42, and an IR receiver 43. The  
20 keyboard preferably functions in a similar way as that explained for the remote control device of the first embodiment, wherein operating software and code data is transmitted from an IR updater 10 to the keyboard 40 via an IR link.

Specifically, the IR receiver 43 of the keyboard 40 receives the information coming in over the IR link. This received operating software or code data is appropriately processed and decoded in the CPU to update the operating software or code data, respectively, and is stored in the memory of the keyboard 40.

5           The data transmitted from the IR updater 10 also may contain commands that request action from the keyboard 40. For example, the data transmitted to the keyboard 40 may require the keyboard 40 to perform diagnostics and report the results. Thus, after receiving a command through the IR receiver 43, the keyboard 40 processes the command, runs the diagnostics, and transmits the results through  
10           the IR transmitter 42 to the IR receiver 12 of the IR updater 10.

          The keyboard 40 also is capable of transmitting signals from the IR transmitter 42 to control external appliances, the signals being based upon commands input through the keys 44 of the keyboard.

          Fig. 4 is a fourth embodiment of the present invention. This figure shows a  
15           system for updating data contained in a keyboard 50 using an RF updater 30. The keyboard 50, therefore, has an RF receiver 53 and an RF transmitter 52. The RF updater 30 may be similar to that discussed above with respect to the second embodiment. The transmission of operating software and code data in the fourth embodiment is updated via a radio link, and is preferably performed in a similar  
20           manner and in the similar variations as discussed for the third embodiment.

          As an additional embodiment, the remote device may be automatically updated as soon as the updater device is powered on, without requiring additional

steps by the user. This feature may be particularly useful if the updater is a component within a television or another appliance controller.

5 It will be apparent to those skilled in the art that various modifications and variations can be made in the system and method for updating a remote control type device of the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modification and variations of this invention provided they come within the scope of the appended claims and their equivalents.

**What is claimed is:**

1. A remote control system comprising:  
a remote device having a CPU, a memory coupled to the CPU for storing operating software and code data for controlling external devices, and keys coupled  
5 to the CPU for inputting commands to the remote device;  
a receiver on the remote device being coupled to the CPU for receiving at least one of operating software and code data over a wireless communication link and transmitting the at least one of operating software and code data to the CPU for decoding; and  
10 a transmitter on the remote device being coupled to the CPU for transmitting control data to the external devices, and for transmitting data to an updater;  
wherein the updater has an updater receiver for receiving data from the transmitter of the remote device and an updater transmitter for transmitting the at least one of operating software and code data to the receiver on the control device.  
15
2. The remote control system of claim 1, wherein the remote device is a handheld remote control device.
3. The remote control system of claim 1, wherein the remote device is a keyboard.
4. The remote control system of claim 1, wherein the wireless  
20 communication link is an IR link.
5. The remote control system of claim 4, wherein the receiver is an IR receiver, the transmitter is an IR transmitter, the updater receiver is an IR receiver, and the updater transmitter is an IR transmitter.

6. The remote control system of claim 1, wherein the wireless communication link is an RF link.

7. The remote control system of claim 6, wherein the receiver is an RF receiver, the transmitter is an RF transmitter, the updater receiver is an RF receiver, and the updater transmitter is an RF transmitter.

8. The remote control system of claim 1, wherein the updater is a component on a television.

9. The remote control system of claim 1, wherein the updater is a component on a personal computer.

10. A remote control system comprising:  
a remote device having a CPU, a memory coupled to the CPU for storing operating software and code data for controlling external devices, and keys coupled to the CPU for inputting commands to the remote device;  
a receiver on the remote device being coupled to the CPU for receiving at least one of operating software and code data over a wireless communication link and transmitting the at least one of operating software and code data to the CPU for decoding; and  
a transmitter on the remote device being coupled to the CPU for transmitting control data to the external devices;  
wherein the updater has an updater transmitter for transmitting the at least one of operating software and code data to the receiver on the control device.

11. The remote control system of claim 10, wherein the remote device is a handheld remote control device.

12. The remote control system of claim 10, wherein the remote device is a keyboard.

13. The remote control system of claim 10, wherein the wireless communication link is an IR link.

5 14. The remote control system of claim 13, wherein the receiver is an IR receiver, the transmitter is an IR transmitter, the updater receiver is an IR receiver, and the updater transmitter is an IR transmitter.

15. The remote control system of claim 10, wherein the wireless communication link is an RF link.

10 16. The remote control system of claim 15, wherein the receiver is an RF receiver, the transmitter is an RF transmitter, the updater receiver is an RF receiver, and the updater transmitter is an RF transmitter.

17. The remote control system of claim 10, wherein the updater is a component on a television.

15 18. The remote control system of claim 10, wherein the updater is a component on a personal computer.

19. A method of upgrading a remote control, comprising the steps of:  
transmitting at least one of operating software and control data from an  
updater transmitter on an updater device to a receiver on a remote device over a  
20 wireless communication link;

receiving the at least one of operating software and code data through the  
receiver on the remote device and sending the received at least one of operating  
software and code data to a CPU in the remote device;



decoding the received at least one of operating software and code data in the CPU; and

storing the decoded at least one of operating software and code data in a memory in the remote device.

5           20.    The method of claim 19, wherein the remote device is a handheld remote control device.

          21.    The method of claim 19, wherein the remote device is a keyboard.

          22.    The method of claim 19, wherein the wireless communication link is an IR link.

10           23.    The method of claim 22, wherein the receiver is an IR receiver and the updater transmitter is an IR transmitter.

          24.    The method of claim 19, wherein the wireless communication link is an RF link.

15           25.    The method of claim 24, wherein the receiver is an RF receiver and the updater transmitter is an RF transmitter.

          26.    The method of claim 19, wherein the updater is a component on a television.

          27.    The method of claim 19, wherein the updater is a component on a personal computer.

20           28.    A method of communicating between a remote device and a data unit, comprising the steps of:

          transmitting communication signals from an updater transmitter on a data unit to a receiver on a remote device over a wireless communication link;

receiving the communication signals through the receiver on the remote device and sending the received signals to a CPU in the remote device;  
decoding the received signals in the CPU;  
determining if the communication signals request that the remote device  
5 perform operations;  
performing operations requested by the communication signals;  
creating data responses resulting from the performed operations; and  
transmitting the data responses from a transmitter on the remote device to an  
updater receiver on the data unit via the communication link.

- 10           29.    The method of claim 28, wherein the remote device is a handheld remote control device.
30.    The method of claim 28, wherein the remote device is a keyboard.
31.    The method of claim 28, wherein the wireless communication link is  
an IR link.
- 15           32.    The method of claim 31, wherein the receiver is an IR receiver, the transmitter is an IR transmitter, the updater receiver is an IR receiver, and the  
updater transmitter is an IR transmitter.
33.    The method of claim 28, wherein the wireless communication link is  
an RF link.
- 20           34.    The method of claim 33, wherein the receiver is an RF receiver, the transmitter is an RF transmitter, the updater receiver is an RF receiver, and the  
updater transmitter is an RF transmitter.

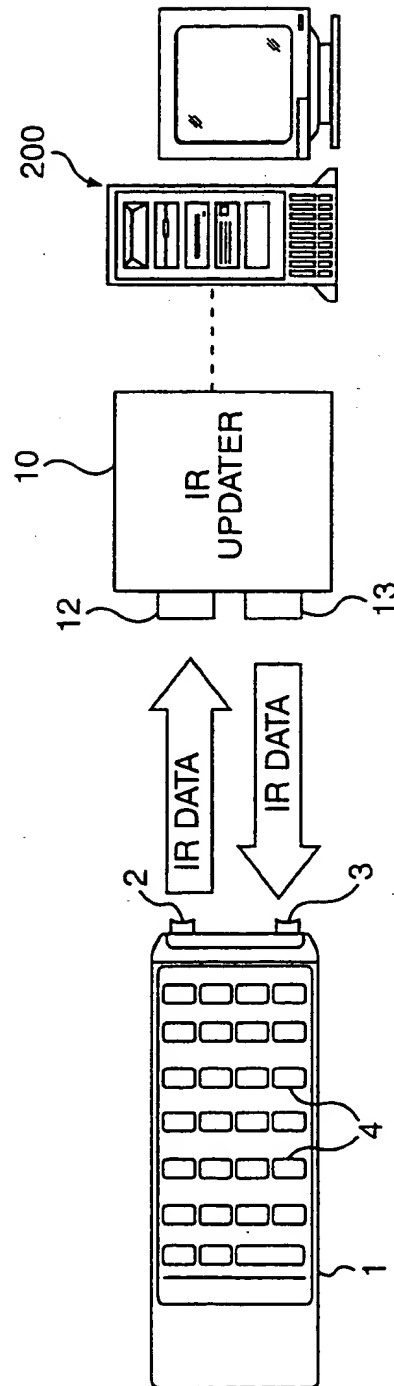
35. The method of claim 28, wherein the updater is a component on a television.

36. The method of claim 28, wherein the updater is a component on a personal computer.

5           37. The method of claim 19, wherein the step of transmitting communication signals to the receiver of the remote device is automatic upon power on of the updater device.

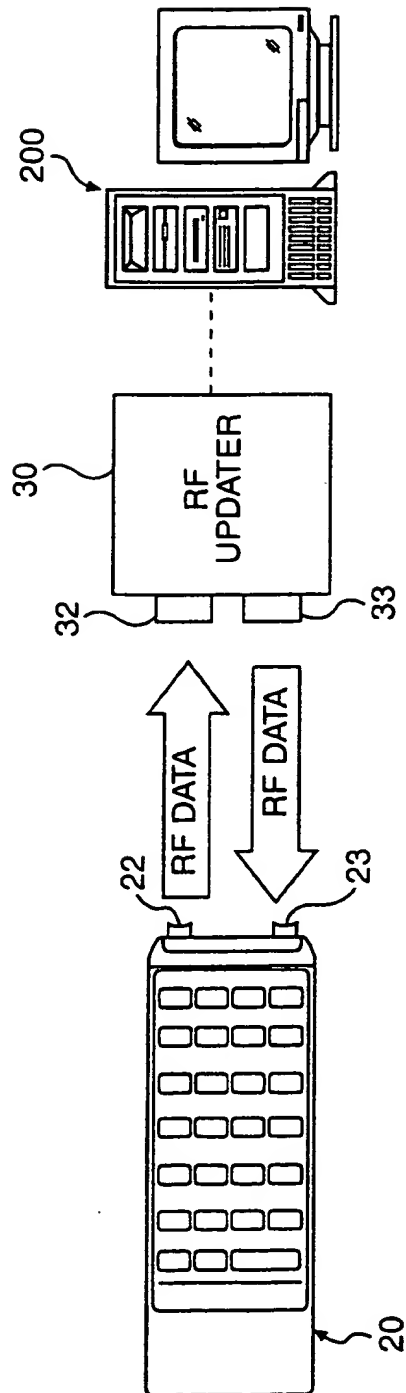
          38. The method of claim 28, wherein the step of transmitting communication signals to the receiver of the remote device is automatic upon power  
10       on of the updater device.

1 / 4



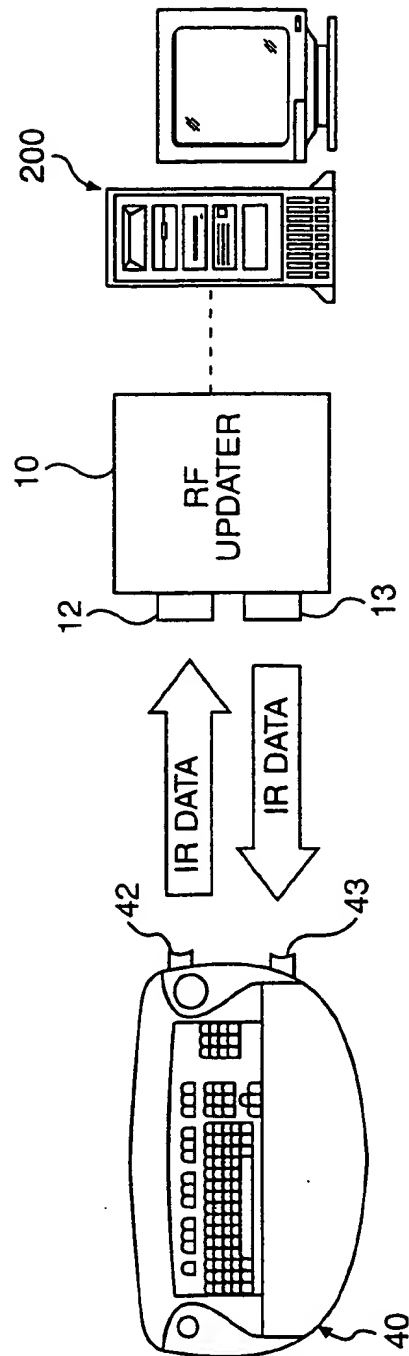
**FIG. 1**

2 / 4



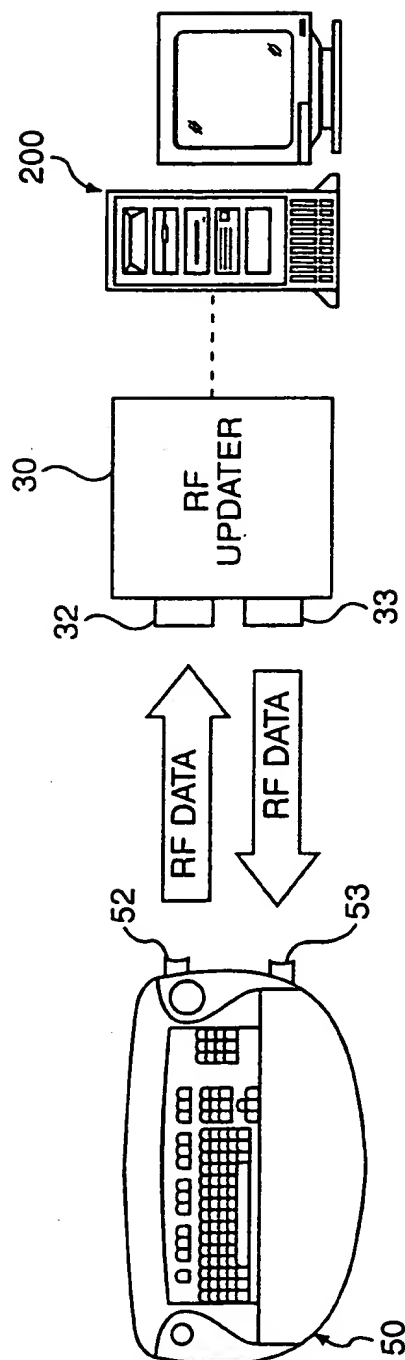
**FIG. 2**

3 / 4



**FIG. 3**

4 / 4



**FIG. 4**

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 99/06796

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G08C19/28

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G08C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 629 868 A (TESSIER ALAIN ET AL) 13 May 1997 (1997-05-13)	1,2,4-8, 10,11, 13-17, 19,20, 22-26
A	column 4, line 29 - column 6, line 33 column 7, line 10 - line 56 ---	28,29, 31-35
X	US 5 668 591 A (SHINTANI PETER) 16 September 1997 (1997-09-16)	1,2,4-7, 10,11, 13-16, 19,20, 22-25
A	column 3, line 1 - column 4, line 9 column 4, line 58 - column 6, line 28 ---	3,12,21, 28,29, 31-34
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

28 July 1999

Date of mailing of the international search report

04/08/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.  
Fax: (+31-70) 340-3016

Authorized officer

Pham, P



# INTERNATIONAL SEARCH REPORT

Int. l. Application No  
PCT/US 99/06796

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	DE 297 16 840 U (UMA ELECTRONIC PRODUKTIONS GMB) 13 November 1997 (1997-11-13) page 5, line 19 - page 8, line 21 -----	1,2, 9-11, 18-20 28,29,36

# INTERNATIONAL SEARCH REPORT

Information on patent family members

In: ational Application No

PCT/US 99/06796

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5629868	A	13-05-1997	BE 1008741 A	02-07-1996
			CA 2140968 A	08-08-1995
			DE 19503761 A	31-08-1995
			FR 2716027 A	11-08-1995
			GB 2286277 A	09-08-1995
			IT MI950158 A,B	07-08-1995
			JP 8214376 A	20-08-1996
			NL 9500169 A	01-09-1995
			PT 101648 A	09-08-1995
US 5668591	A	16-09-1997	JP 7271697 A	20-10-1995
			GB 2288044 A,B	04-10-1995
DE 29716840	U	13-11-1997	EP 0903710 A	24-03-1999